

## ASOS MODIFICATION NOTE 63 (for Electronics Technicians)

Engineering Division

W/OSO321: WDW

SUBJECT : Ground-To-Air (GTA) radio installation into the Automated Surface Observing System (ASOS) Acquisition Control Unit (ACU) cabinet

PURPOSE : To enable ASOS to transmit regularly updated surface observations and information to pilots and other listeners.

EQUIPMENT AFFECTED : ASOS ACU Cabinet

PARTS REQUIRED : Field modification kit (FMK) S100-FMK51 (See appendix B)

MOD PROCUREMENT : A GTA radio is required for all specified ASOS sites. Washington Central Support will issue one GTA radio, S100-1A10, for each ASOS identified in appendix A.

EFFECTIVITY : See appendix A

TOOLS REQUIRED : Small slotted screwdriver  
Medium phillips screwdriver  
11/32" (0.3438) wrench  
Anti-seize compound  
*Cabinets that require a J43 connector:*  
3/8" drill and drill bits: 1/8" (0.1250) and 41/64" (0.6406) or 5/8" (0.6250)  
Sand paper  
Wire stripper  
14 gauge grounding wire

TEST EQUIPMENT REQUIRED : Telephone jack module  
600-ohm resistor  
Analog oscilloscope  
Site technical manual (STM)  
Errata 1 to Maintenance Note 42

TIME REQUIRED : 3 hours

AFFECT ON OTHER INSTRUCTIONS : None

AUTHORIZATION : This modification is authorized by RC's **S00930 (FAA057)** and **S00929 (FAA056)**.

VERIFICATION  
STATEMENT

This modification was installed and verified at PAH, ABQ,  
: LWD, RTN and RNM.

**GENERAL**

The GTA radio system enables ASOS to continuously transmit weather observations to the aviation community. Radio, 1A10, interfaces with the voice recorder/player board and transmits these signals across an omni-directional antenna.

**PROCEDURE**

The instructions for this modification note describe the installation, system checkout, and acceptance procedures for a GTA radio in the ACU.

**BEFORE INSTALLATION OF THE GTA RADIO**

1. Validate the FMK parts list provided in appendix B. If any part is missing from the FMK, report this to ASOS Maintenance Assurance at 1-301-713-1833 x156.
2. Call the ASOS Operations and Monitoring Center (AOMC) at 1-800-242-8194 and provide notification on which ASOS you will be installing the GTA radio.
3. Get approval of the responsible MIC/OIC/observer before starting installation. Installation of the GTA radio may be performed on any day of the month if restrictions in steps 4 and 5 are satisfied.
4. **Commissioned Sites Only:** Do not start installation during inclement weather, precipitation, instrument flight rule conditions, or if any of those conditions are expected within 3 hours. The responsible MIC/OIC/observer will define these meteorological conditions.
5. Do not start the GTA radio installation at a time that will conflict with scheduled synoptic observations at 00, 03, 06, 09, 12, 15, 18, and 21Z. Allow four hours to complete the installation and restart the ASOS.
6. Immediately before beginning work at National Weather Service (NWS) staffed sites, the MIC/OIC/observer shall inform the air-traffic-control tower (ATCT) and any other critical users that ASOS will be turned off for the ACU upgrade. At an unstaffed site, the electronics technicians shall inform the tower using controller-video displays and operator interface devices (OID) to log off and shut down the displays to avoid problems.
7. Do not begin the installation process until immediately after an hourly observation has been transmitted. At NWS-staffed sites, normal backup observing procedures shall be implemented.

8. At the OID, log on as TECH.
  - a. Key **MAINT - ACT - FMK** and enter **MOD 63**.
  - b. Key **MAINT - ACT - FMK - START**.

### **INSTALLATION OF THE GTA RADIO IN A CLASS II ACU**

#### **NOTE:**

One RS-232 SIO port is needed to install the GTA radio. **DO NOT use SIO #1 or SIO #3 Port 1.** Also, remember on a given SIO board, ports 1 and 2 are tied to a common UART as are port 3 and 4. If a CODEX modem is installed in the ACU, do not use the paired port on which the modem is installed. Install an SIO board only if the system does not have one unused RS-232 port.

#### **NOTE:**

Prior to starting this FMK, make a printout of the system maintenance page. If there are any failures, make copies of the maintenance pages of the failed unit.

1. At the OID, sign on as TECH and press **REVUE - SITE - CONFIG - COMMS**. Check for the availability of an RS-232 port and obtain a printout of this page for further reference.
2. If there is a spare port available, record its location. If an RS-232 port is not available, an additional board will need to be installed.
3. If installed, set the UPS power switch (1A4) to 0 (OFF).
4. Remove the ACU facility power cable (1A10-J41).

#### **CAUTION**

**Carefully remove ALL connections from the I/O Panel Assembly 1A9. This panel must be completely removed in order to install the rails for the UPS tray. Any connection to the panel may result in broken wires or connectors as the I/O panel is removed.**

5. Remove the 6 retaining screws from the I/O panel and lower the top of the panel toward the floor.

#### **NOTE:**

Perform steps 6 thru 9 if the peripheral cable assembly (62828-42011-20) is not already installed in the ACU.

#### **NOTE:**

The top flap of the peripheral cable assembly must be installed behind the cross member.

6. Referring to figure 1 on the following page, at the back of the ACU cabinet on the fourth shelf from the top (1A4), remove the top screw, lockwasher, and flat washer, from the vertical unistrut and cross member on the right side of the cabinet.
7. Insert the top flap of the cable assembly under the cross member. Reinstall the screw, lockwasher, and flatwasher.
8. Install a unistrut nut (62828-90288-1), 1/4" screw (MS35307-306), 1/4" lockwasher (MS35338-139), and 5/8" flatwasher (MS15795-810), at the lower mounting hole of the cable assembly and the vertical unistrut.

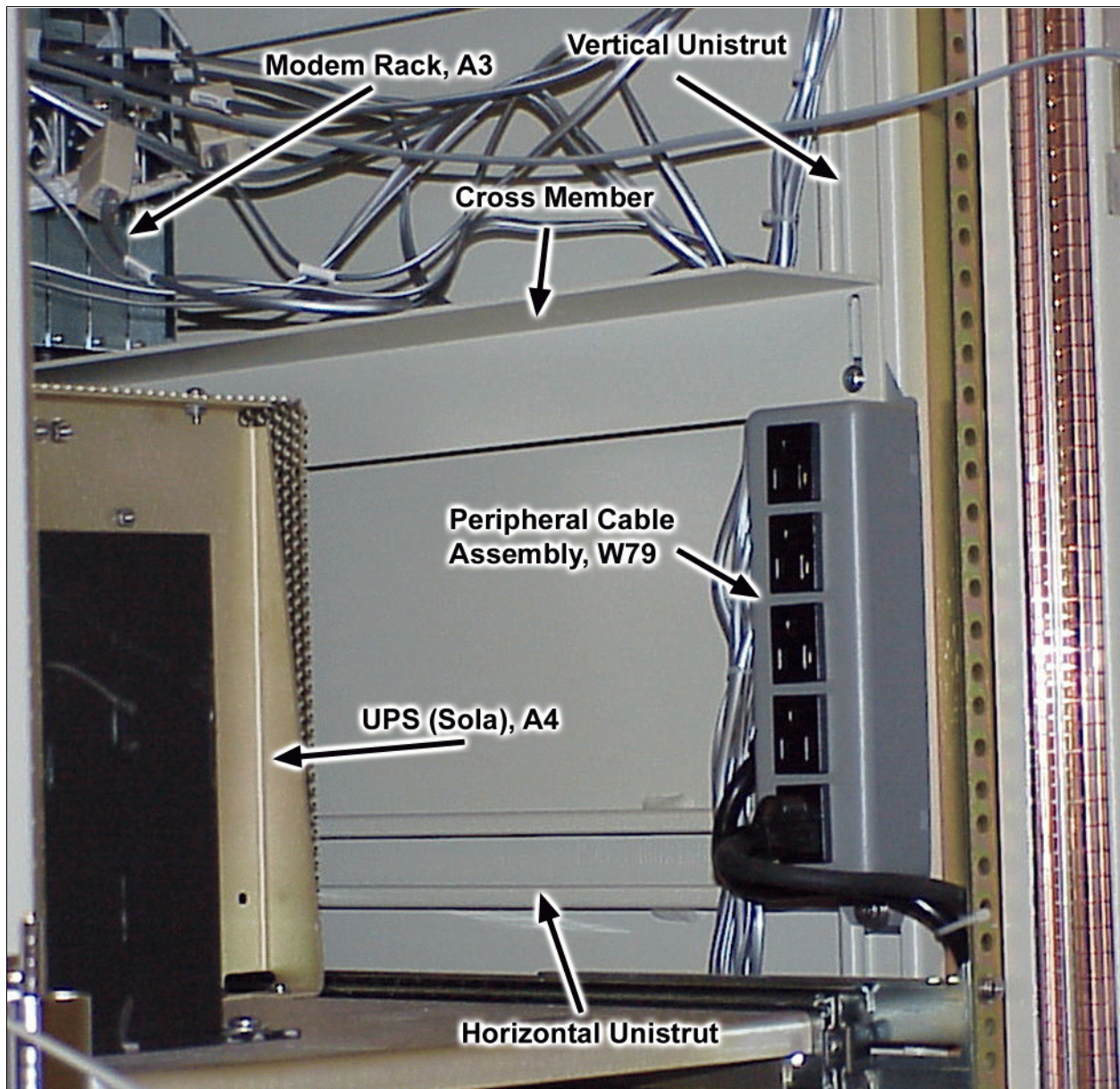


Figure 1 Back of ACU Cabinet with Peripheral Cable Assembly

9. Run the peripheral cable assembly power cord behind the cabinet brackets and horizontal unistruts to the power distribution assembly (PDA), A7. Add the following cable connections to the PDA:

**NOTE:**

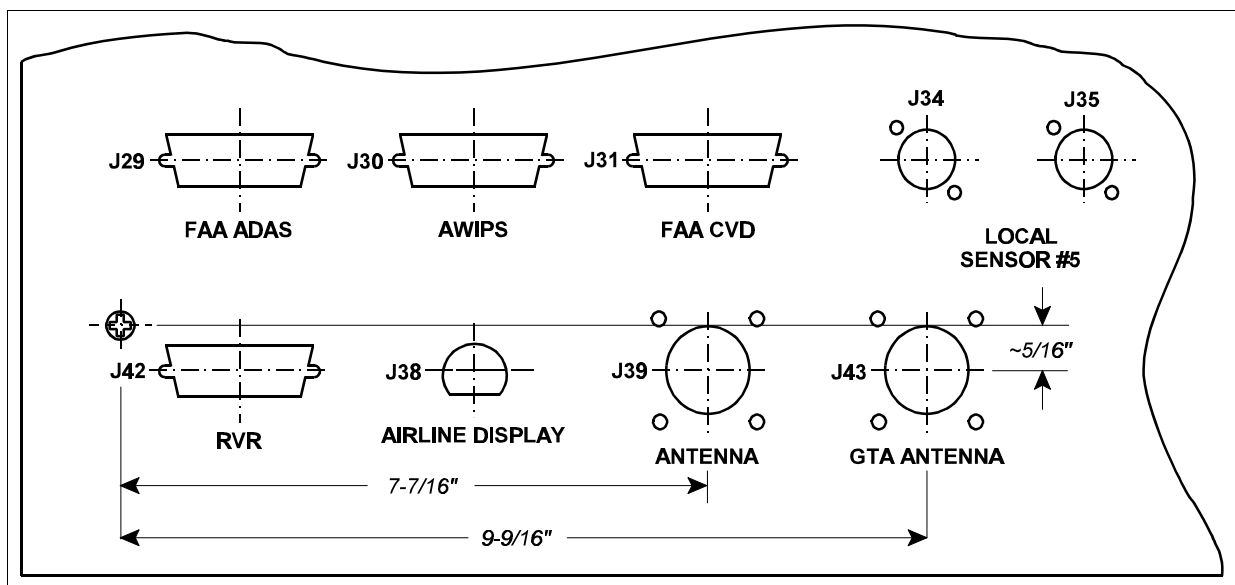
There are already wires connected at the following positions on the PDA.

- a. Connect W79 BLACK WIRE to 1A7-23C.
- b. Connect W79 WHITE WIRE to 1A7-22C.
- c. Connect W79 GREEN WIRE to 1A7-21C.

**NOTE:**

Perform steps 10 thru 14 only if connector J43 needs to be added to the I/O panel.

10. Place the I/O panel on a suitable working area. Referring to figure 2, drill out the center hole for the J43 GTA Antenna connector.



**Figure 2 Cutout Location for J43**

11. Cut out the template in appendix C. Use it to mark the four corner screw holes associated with the J43 connector. Drill the four marked screw holes.
12. Locate the polyphaser RF surge protector (62828-90198-1) and remove the "L" mounting bracket.

13. Remove the four screws around the antenna connector on the surge protector. Install the surge protector into the J43 hole. Reinstall the four screws, running them through the I/O panel and back into the surge protector.
14. At the AC power connector, trace a line around the connector using a pencil. Remove the AC power connector from the I/O panel, then remove all paint from the outline using sandpaper. This will ensure proper grounding for the EMI/RFI filter due to the increased current draw from the installed GTA radio.

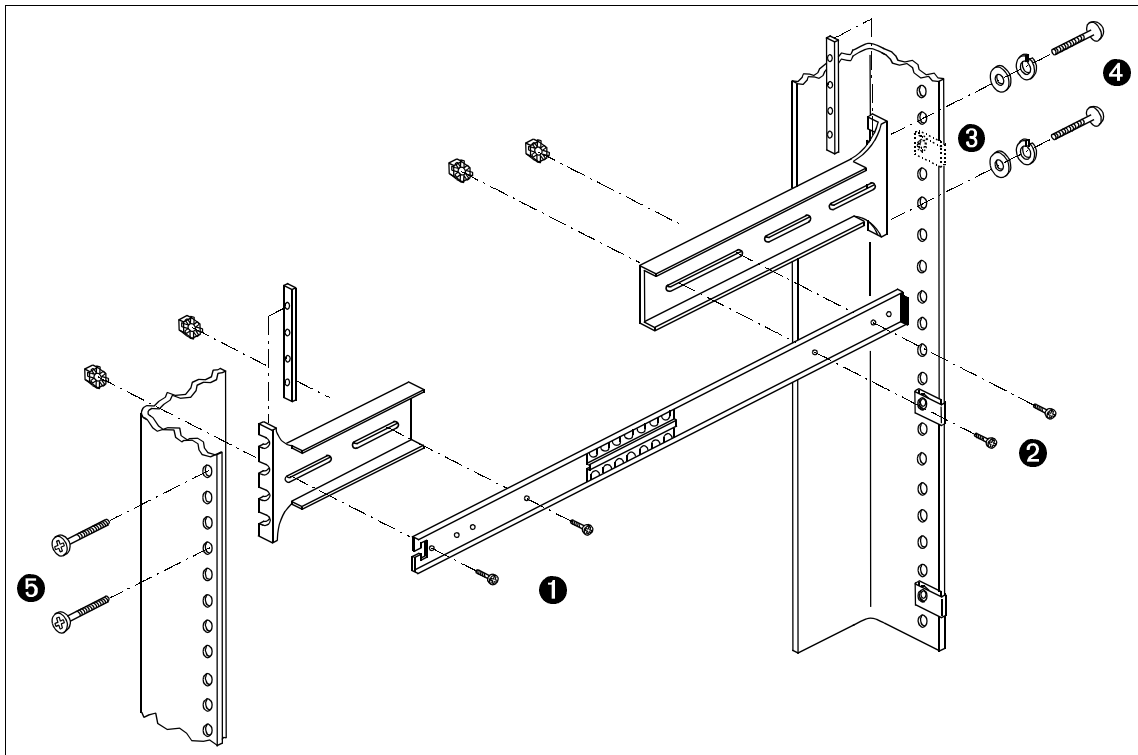
NOTE:

At the technician's discretion, use a marker or pencil and identify the new J43 connector as "GTA ANTENNA".

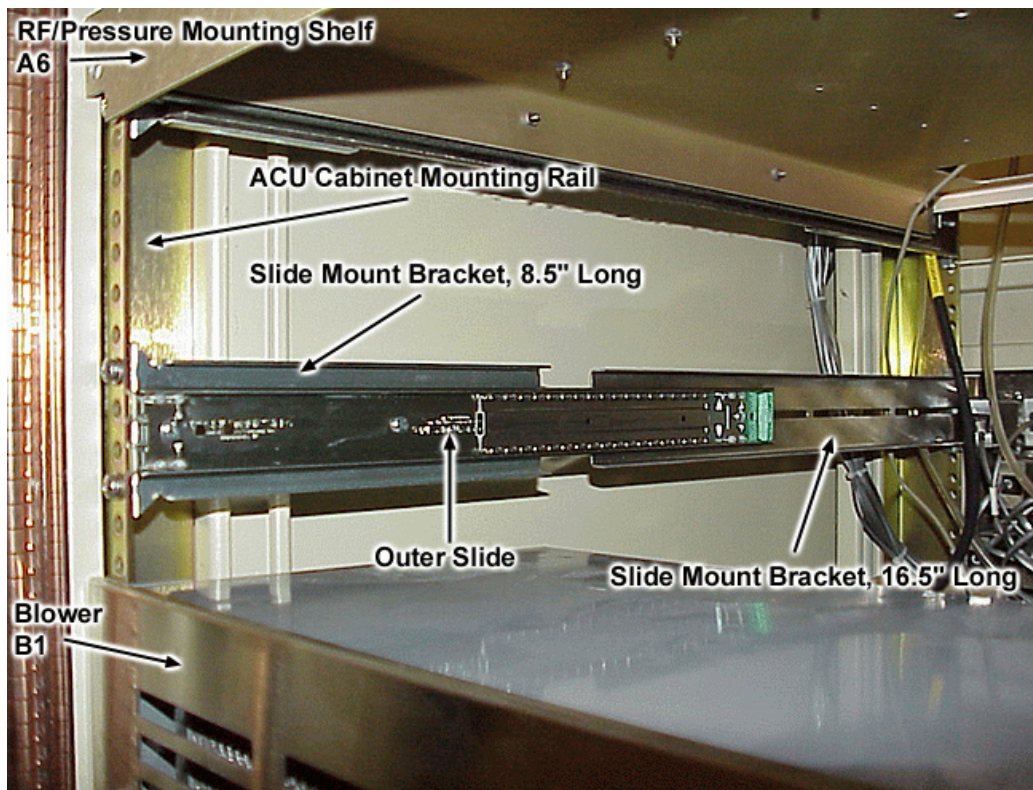
15. Pull the coax for the antenna cable, W9, as required to connect the ACU to the antenna.
16. Terminate connectors to both ends of the antenna coax cable. Testing this cable in accordance with table 12.5.6 in the STM will verify this step.
17. Connect the antenna cable, W9, connector P1 to the J43 connector on the I/O panel. Connect the antenna cable, W9, connector P2 to the J1 connector of the antenna.
18. At the front of the ACU cabinet, if the blower, B1, is not already mounted at the lowest position in the ACU cabinet, move B1 to the bottom of the ACU cabinet so the GTA radio can be installed between it and the RF/pressure mounting shelf.
19. Construct *both* mount bracket assemblies. Refer to figures 3 and 4.
  - a. Using two screws and lock nuts provided in the FMK, firmly attach the outer slide to the 8.5" slide mount bracket (62828-90220-2). Ensure the slide is flush with the flange on the slide mount bracket. Refer to 1 in figure 3.
  - b. Using two screws and lock nuts provided in the FMK, attach the outer slide to the 16.5" slide mount bracket (62828-40251-1). Refer to view A, 1 in figure 3. *This second set of screws will be tightened after the entire slide assembly has been adjusted for proper fit inside the ACU cabinet.*
20. At the 1A10 position in the rear of the cabinet, begin installation of the slide mount bracket assemblies into the ACU cabinet. Refer to figure 3.
  - a. Remove the top left and right I/O panel clip nuts from the cabinet mounting rails. Refer to 1 in figure 3.
  - b. Thread two No. 10 screws (MS51958-65), No. 10 lockwashers (MS35338-138), and 7/16" flatwashers (MS15795-808) through the ACU cabinet mounting rail and into a nut bar (62828-90221-1). Refer to i in figure 3.
  - c. Apply loctite (M22473C) to the screws in the nut bar.

- d. Install the slide mount bracket between the nut bar and the ACU cabinet mounting rail and tighten down the screws at **ii** .
21. At the front ACU cabinet, attach the slide mount brackets.
- a. Thread two counter sunk screws (MS42696-C272) through the ACU cabinet mounting rail and into a nut bar.
  - b. Again, apply loctite to the countersunk screws in the nut bar.
  - c. Insert the slide mount bracket between the nut bar and the mounting rail, and tighten down the counter sunk screws. Refer to **Ø** in figure 3.





**Figure 3 Left Slide Mount Bracket Assembly (Exploded View)**



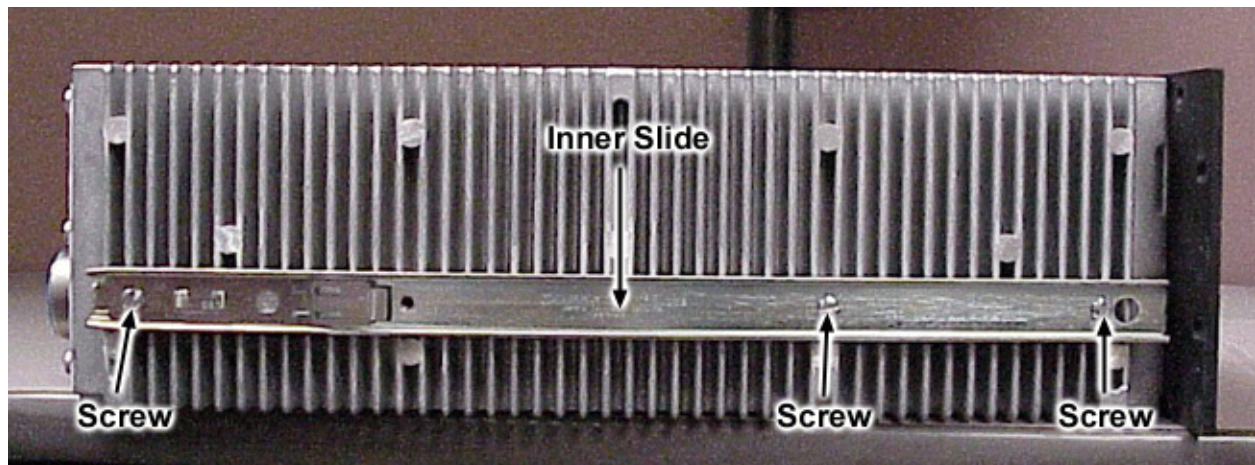
**Figure 4 Slide Mount Bracket Assembly Photo**

EHB-11  
Issuance 99-17  
11/16/99

22. With the bracket mounting assemblies installed in the ACU, tighten down any remaining loose bolts on the slides.
23. Attach the inner slides to each side of the GTA.

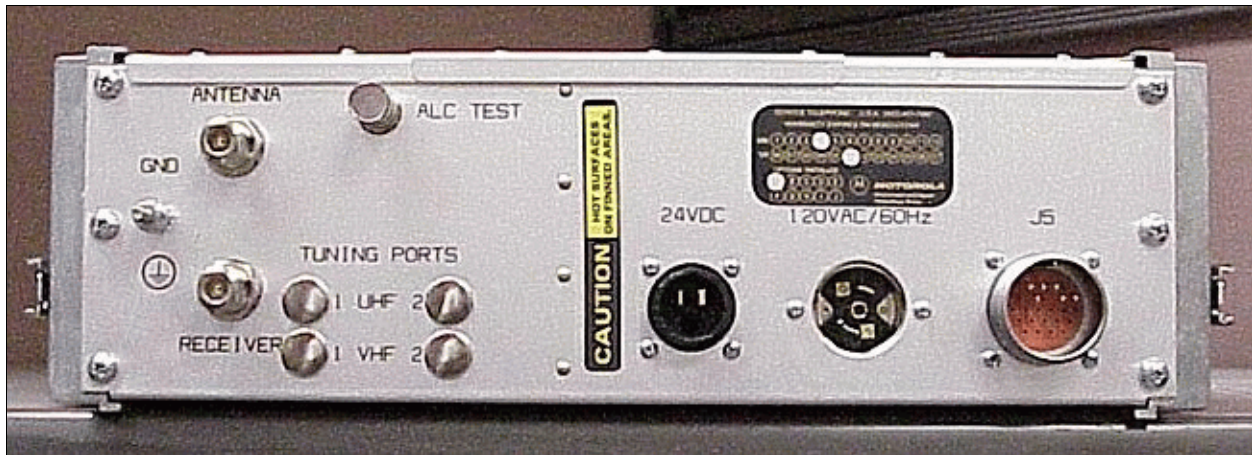
**NOTE:**

When installing these screws, they will fit very tightly into the side of the GTA radio. At the technician's discretion, apply a small amount of any anti-seize compound to the screw threads. This will reduce the binding of the aluminum screw as it is threaded into the aluminum heat sink on the side of the GTA radio. Refer to figure 5.



**Figure 5 Left Slide of GTA Radio with Inner Slide Attached**

24. Slide the GTA radio into the ACU cabinet. The slide mount bracket assemblies may need slight adjustments to ensure a proper fit.
25. Remove the handles at this time, they will prevent the cabinet door from closing.
26. At the front of the ACU cabinet, on the right edge, label the position of the GTA radio (in the same manner as positions A1, A2, A3, etc.) as "A10."
27. Connect P1 of W076 cable (62828-42027-10) to the remote connector "J5" on the back of the GTA radio. Install the W076 cable per wire markers and figure 6.
28. Connect antenna cable W51 (62828-42016-40) from the back of the surge protector J43 to the "ANTENNA" connector on the back of the GTA radio. Refer to figure 6.
29. Connect the power cable assembly A10 from the "120 VAC/60 Hz" connector on the radio (refer to figure 6) to one outlet on the peripheral cable assembly (power strip) W79. Re-install the A9 I/O panel and all interface cables and connectors.



**Figure 6 GTA Radio Back Panel Connectors**

**NOTE:**

Perform step 30 only if an SIO board needs to be added to the system.

30. At the VME rack 1A2: remove the blank panel from the first available SIO slot (1A2A9, 1A2A10, or 1A2A11).
  - a. Configure the SIO board (62828-47014) as shown in the STM, Change 1, on page 2-177, "Circuit Card Assembly, SIO, RS-232." Example: If SIO board is #6 (1A2A10), set jumpers for a 62828-47014-50 board.
  - b. Install the SIO board in the slot where the blank panel was removed.
  - c. Remove JACK jumper from the rear of the VME backplane slot where the SIO board was installed.
31. Locate a spare SIO cable bundle inside of the ACU. Find the cable for the SIO port recorded in step 2 or the first port of the new SIO board just installed.
32. Connect the spare SIO cable bundle to the P2 connector of the W076 cable.
33. Connect phone cable, W16 P67, to the P3 connector of the W076 cable.
34. Connect a 14 AWG green wire from the GTA ground point E1 to the ACU chassis ground.
35. Slide the GTA radio all the way in securing it to the cabinet with No. 10 screws threaded through the front of the GTA faceplate and into the nut bars behind the ACU mounting rails. The alignment of the radio with respect to the ACU mounting rails will determine how many screws can successfully mate with the nut bars.
36. Apply power to the ACU. Switch the UPS on if applicable.

37. Depress the AC PWR switch on front of the GTA radio.
38. Return to the OIL and sign on as a technician.

**NOTE:**

Perform step 39 only if a new SIO board was added.

39. At the OIL, press **REVUE - SITE - CONFG - HDWE - CHANGE** and move the cursor to ACU SIO. Press **SEQN** one time (increase SIO quantity by one). Press **BACK - BACK - COMMS**.

**NOTE:**

Perform steps 40 and 41 only if Firmware Rev. 2.1 or greater is installed.

40. At the OIL, press **REVUE - SITE - CONFG - COMMS** and move the cursor to the SIO slot recorded in step 2 or the location of the installed SIO board.
41. Press **CHANG** and set the port up as follows:

	FUNCTION	GTA RADIO	
STATUS	<b>ENABLED</b>	HANDSHAKE	<b>NONE</b>
BAUD RATE	<b>1200</b>	CONNECTION	<b>HARD-WIRE</b>
PARITY SELECT	<b>NONE</b>		
BITS/CHAR	<b>8</b>		
STOP BITS	<b>1</b>	FREQUENCY	Y
		POWER LEVEL	Y

**Table 1 COMMS Page Setup**

- Y Enter the site-specific FREQUENCY and POWER LEVEL values assigned to the ASOS under modification. If these values have not been assigned to a site, enter the following values:

FREQUENCY	<b>118.000</b>
POWER LEVEL	<b>050</b>

42. Press **EXIT**.



## AFTER GTA RADIO INSTALLATION

### NOTE:

Do not radiate into the antenna using a test frequency. Use a dummy load as the antenna for all tests that require an antenna to be connected. At the end of testing, secure power to the GTA radio. The Federal Aviation Administration is licensed for a maximum power output of 2.5 watts at the transmitter. Do not exceed this 2.5 watt output limit.

1. Proceed with the following GTA radio checks by referencing their associated documents:

	GTA Radio Check Procedure	Reference	Sign-Off
A:	Voice Recorder/Playback Board Check	Errata 1 - Maintenance Note 42	
B:	RF Power Output Check	STM - Table 12.5.2	
C:	Modulation Level Check	STM - Table 12.5.3	
D:	VSWR at Transmitter Output Check	STM - Table 12.5.4	
E:	Frequency Stability Check	STM - Table 12.5.5	
F:	Coax Cable Conductance and Insulation Check	STM - Table 12.5.6	

**Table 2 GTA Radio Checkout Procedure List**

2. Call the AOMC at 1-800-242-8194 and inform the operator of:
  - a. Your location.
  - b. The installation of the GTA radio in the ACU has been completed.
3. Enter in the SYSLOG that this modification has been completed.
  - a. At the OIL, press **MAINT - ACT - FMK**.
  - b. Enter the number as follows: **Mod 63**.
  - c. On the second line of the screen, verify that only Mod 63 is displayed. Complete by entering **Y** in the [Y/N] area if only Mod 63 is displayed.
  - d. Check the SYSLOG and verify the FMK message. Enter a comment in the SYSLOG stating that the GTA radio Mod has been completed.

## REPORTING MODIFICATION

Target date for completion of this modification is 30 days after receipt of parts. Report the completed modification on a NWS Form A-26, Maintenance Record, using the instructions in Engineering Handbook No. 4 (EHB-4), Engineering Management Reporting System (EMRS), part 2, appendix A. Report the modification to the ACU using equipment code **AGTA** in block 7. Record the serial number of the GTA radio in block 8. Record the modification number as **63** in block 17a of the A-26.

John McNulty  
Chief, Engineering Division

Appendix A - Site Table  
Appendix B - Parts List  
Appendix C - J43 Template  
Appendix D - A-26 Form

W/OSO321:W.Whisel:713-1833x156  
updated:10/29/99:src:spellcheck:10/29/99  
File:K:\OSO32\OSO321\Asos Temps\Mod 63.wpd

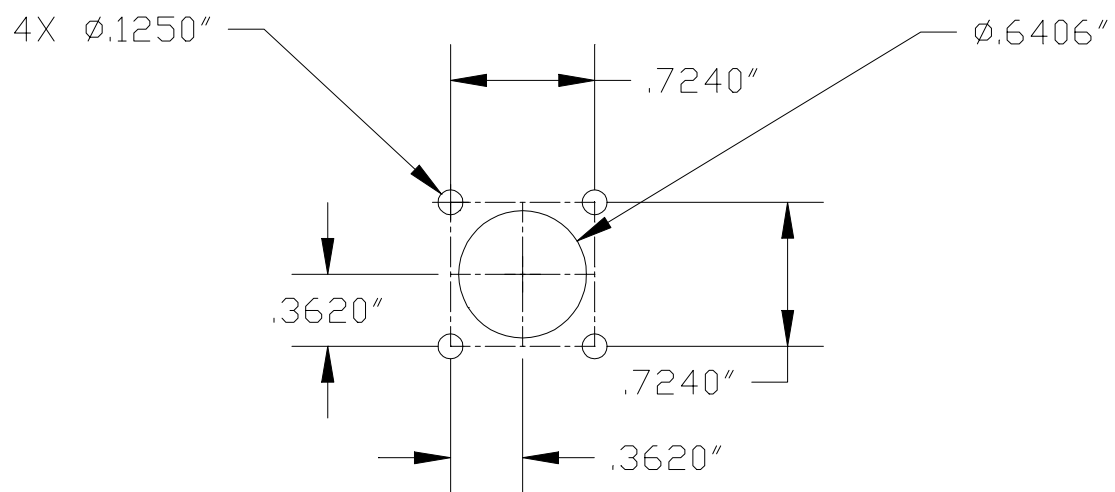
## APPENDIX A

ASOS Sites to add a GTA Radio			
Site ID	City, State	Region	Site Classification
CUT	Custer, SD	Central	I
GCC	Gillette, WY	Central	I
IRK	Kirksville, MO	Central	I
LWD	Lamoni, IA	Central	I
MBG	Mobridge, SD	Central	I
MIE	Muncie, IN	Central	I
PHP	Phillip, SD	Central	I
POF	Poplar Bluff, MO	Central	I
AKQ	Wakefield, VA	Eastern	II
AQQ	Apalachicola, FL	Southern	I
JCT	Junction, TX	Southern	I
RMG	Rome, GA	Southern	I
RTN	Raton, NM	Southern	I
PJON	Johnston Island	Pacific	I
AAT	Alturas, CA	Western	I
LLJ	Challis, ID	Western	I
MYL	McCall, ID	Western	I
RNM	Ramona, CA	Western	I
SHN	Shelton, WA	Western	I

<b>S100-FMK51</b> <b>Ground-To-Air Radio Parts List</b>		
Part Number	Quantity	Nomenclature
62828-40251-1	2	Slide mount bracket, 16 ½" long
62828-42011-20	1	Peripheral cable assembly W79
62828-42016-40	1	Antenna cable assembly W51
62828-42027-10	1	GTA radio cable assembly, W76
62828-90198-1	1	RF surge protector
62828-90220-2	2	Slide mount bracket, 8 ½" long
62828-90221-1	4	Nut bar
62828-90288-1	1	Unistrut nut
62828-90316-10	1	Ground to air radio
M22473C	1	Bottle of Loctite
MS15795-803	4	1/8"ID x 1/4"OD flatwasher
MS15795-808	8	7/32"ID x 7/16"OD flatwasher
MS15795-810	1	9/32"ID x 5/8"OD flatwasher
MS35307-306	1	1/4" screw, 3/4" long
MS35338-135	4	No. 4 lockwasher
MS35338-138	8	No. 10 lockwasher
MS35338-139	1	1/4" lockwasher
MS42696-C272	4	Counter sunk screw
MS51957-16	4	No. 4 screw, 7/16" long
MS51958-65	8	No. 10 screw, 3/4" long



J43 Template



**EMRS A-26 Form**